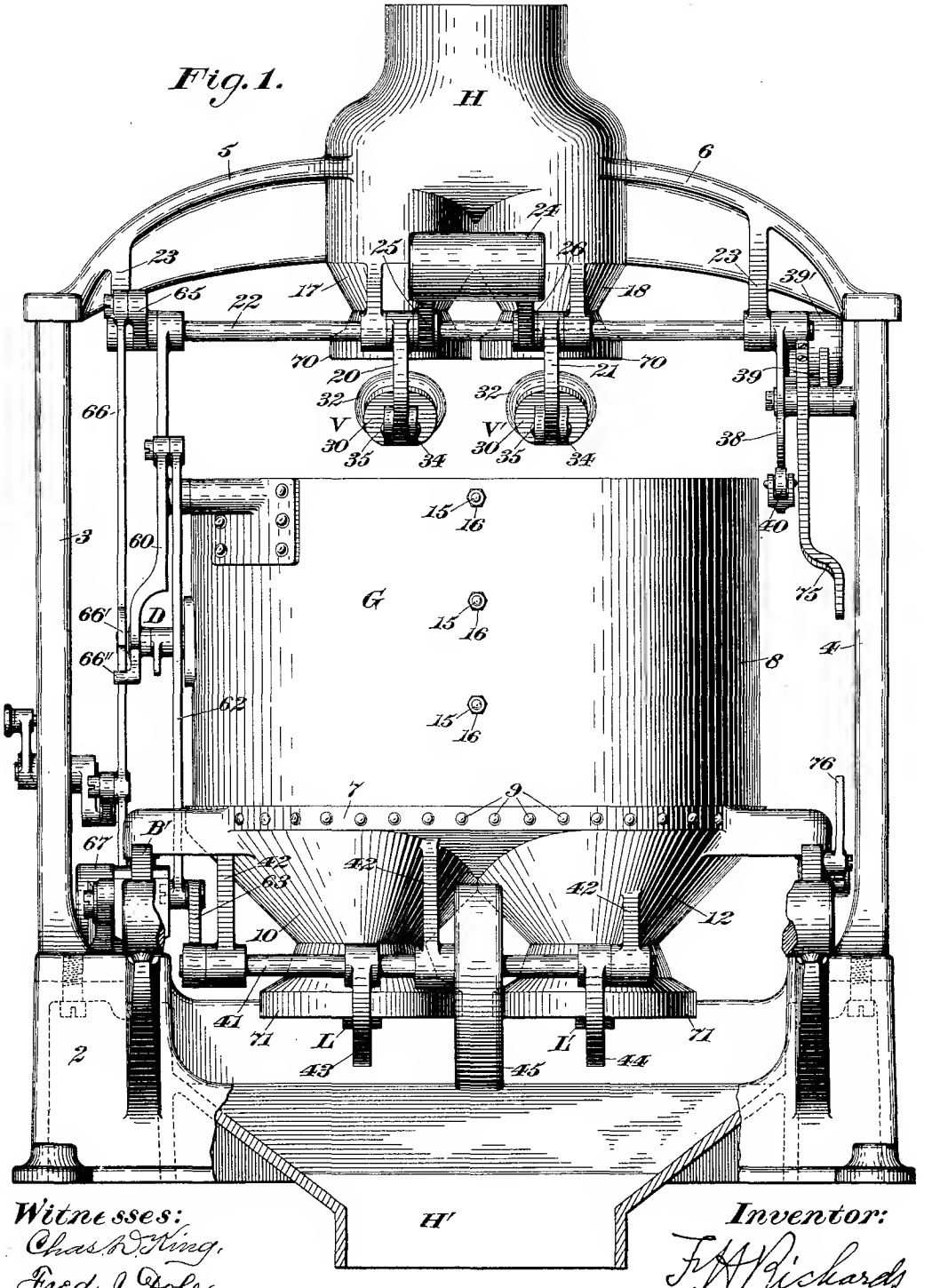
(No Model.) 6 Sheets—Sheet 1.

F. H. RICHARDS.

WEIGHING MACHINE.

No. 600,025. Patented Mar. 1, 1898.

Fig. 1.



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WEIGHING MACHINE.

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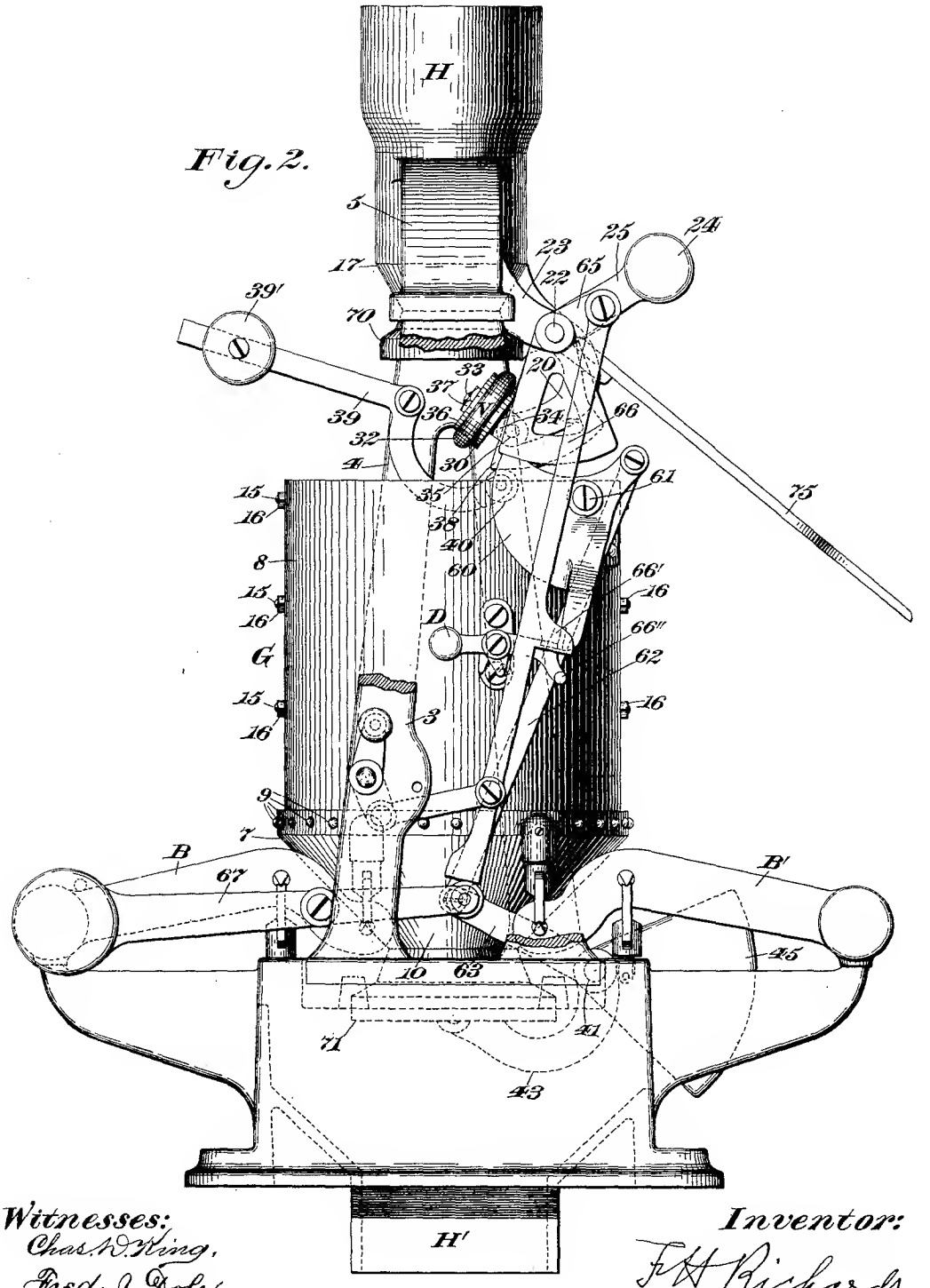
Fig. 2.



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WEIGHING MACHINE.

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Fig. 7.

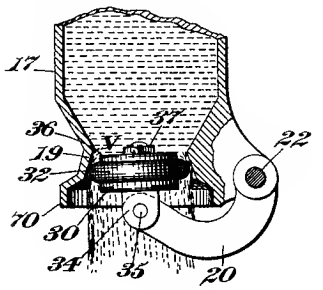

Fig. 3.

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(No Model.) 6 Sheets—Sheet 4.

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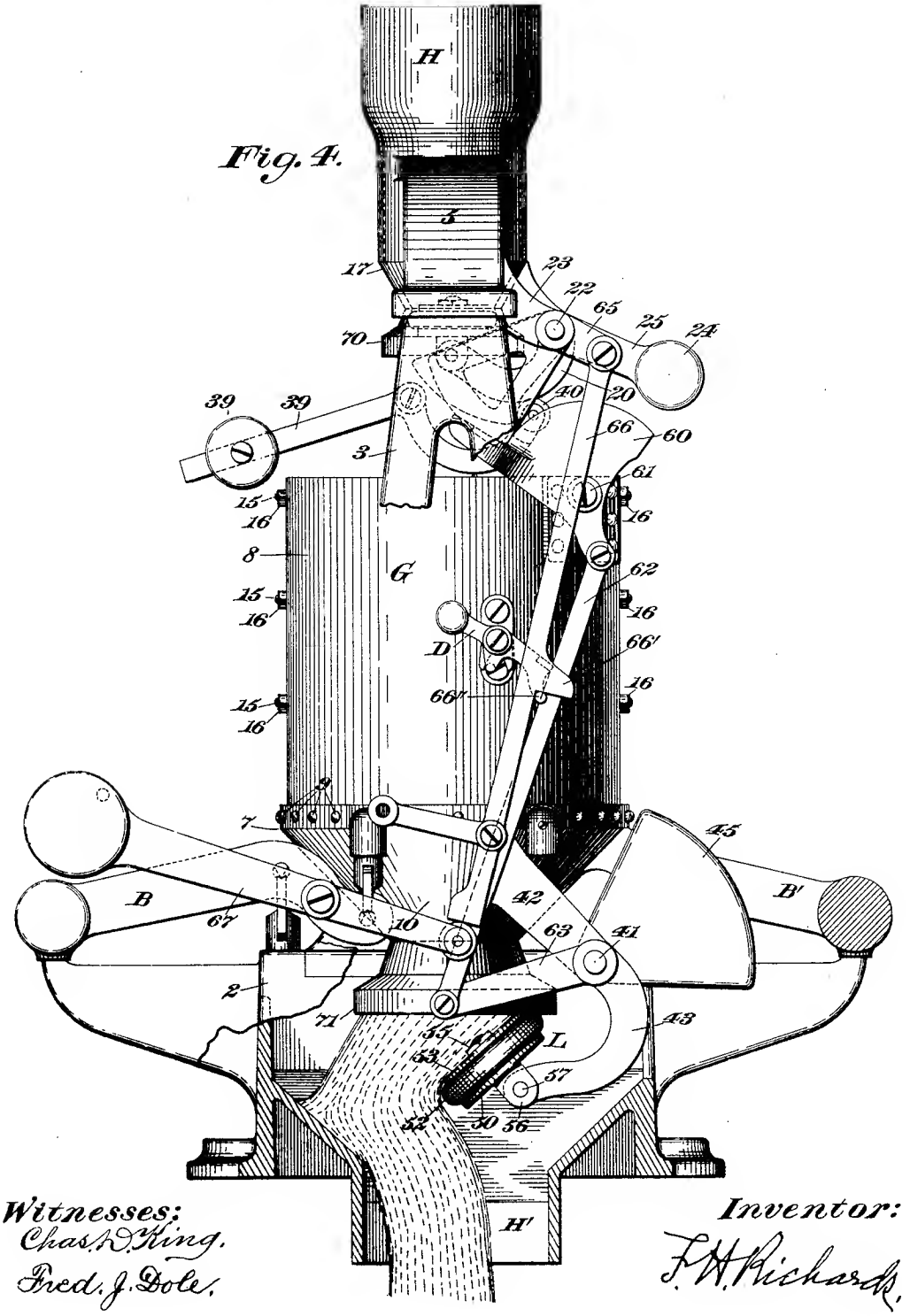
WEIGHING MACHINE.

No. 600,025. Patented Mar. 1, 1898.

Fig. 4.



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WEIGHING MACHINE.

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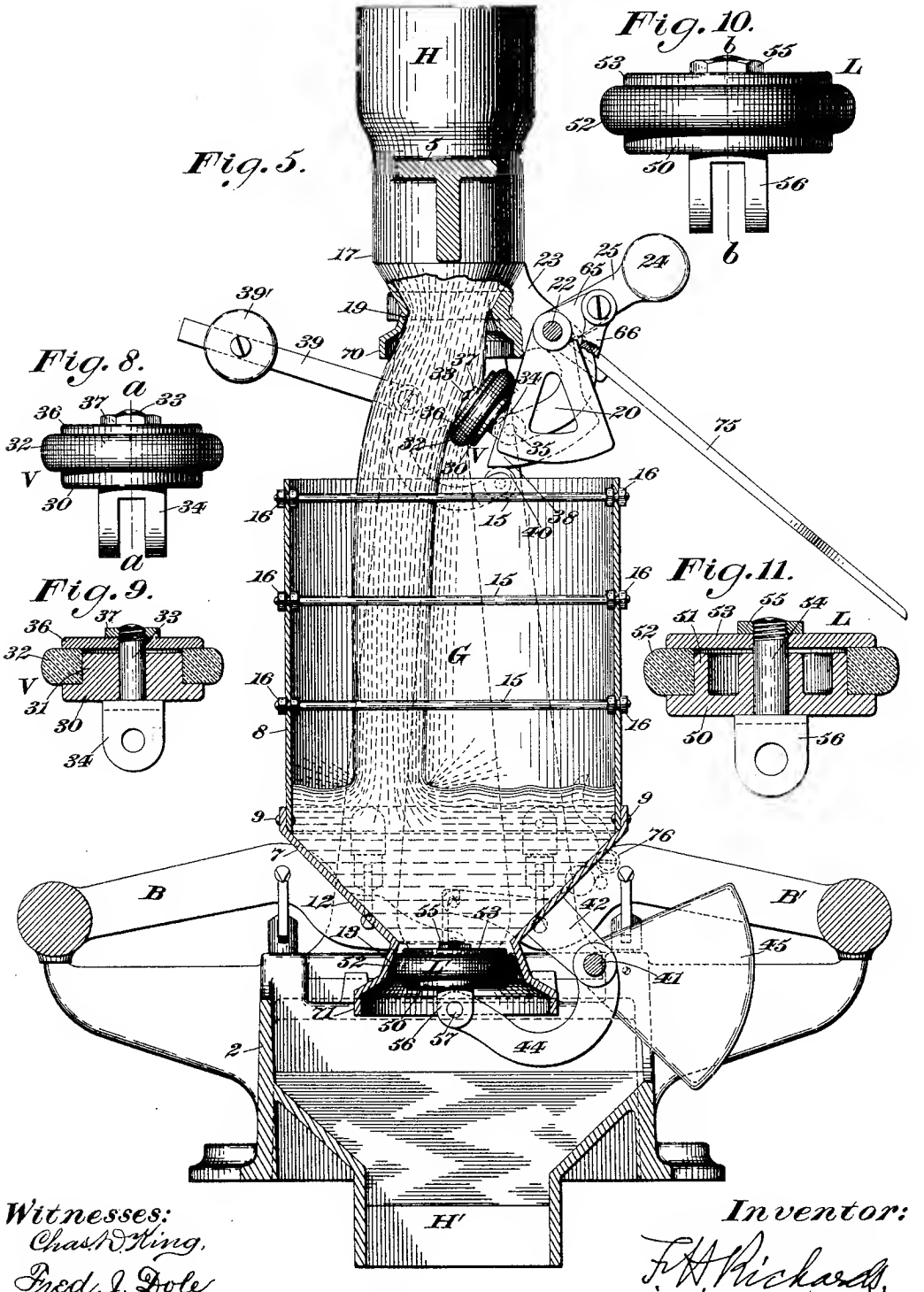

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(No Model.) 6 Sheets—Sheet 6

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WEIGHING MACHINE.

No. 600,025. Patented Mar. 1, 1898.

Fig. 6.

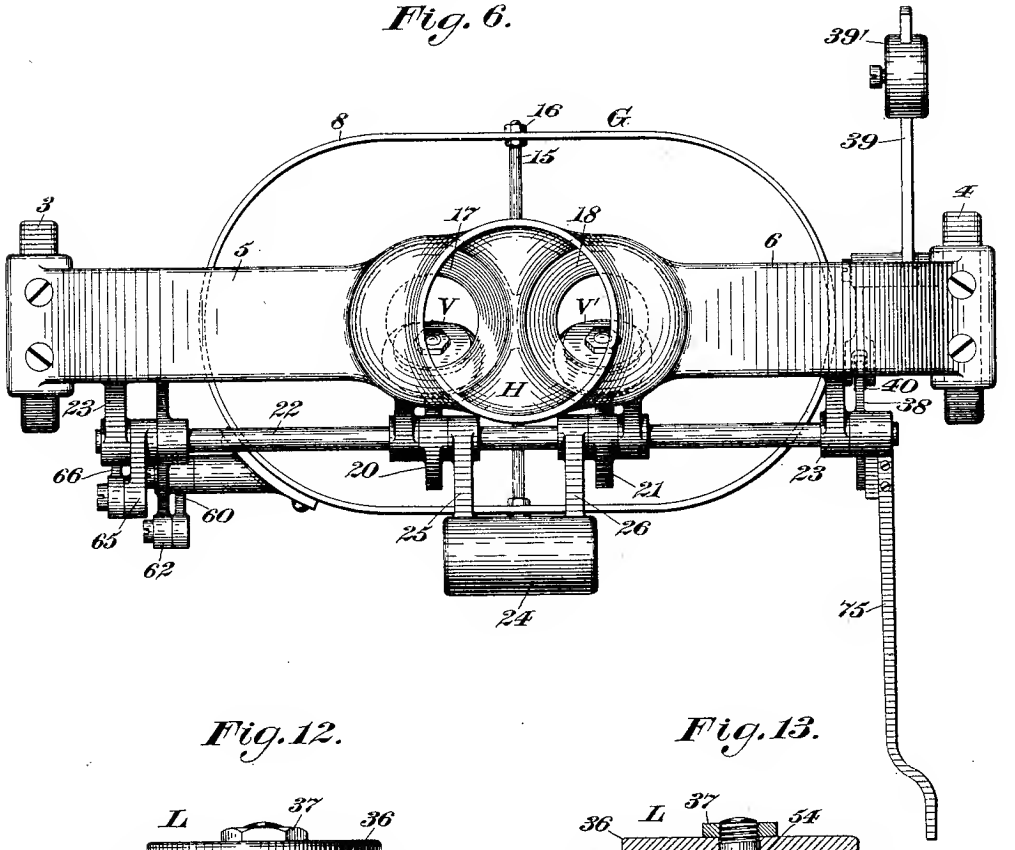


Fig. 12.

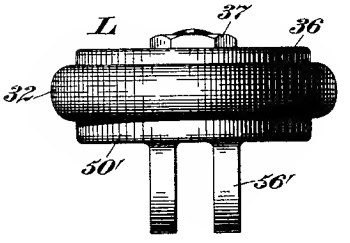
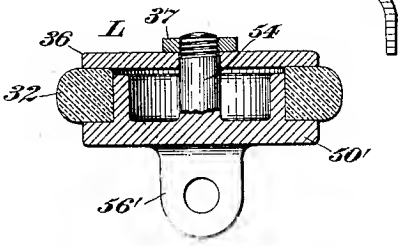


Fig. 13.



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UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT.

WEIGHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 600,025, dated March 1, 1898.

Application filed June 5, 1897. Serial No. 639,494. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Weighing-Machines, of which the following is a specification.

This invention relates to weighing-machines, the object being to provide an improved machine of this character more especially intended for weighing liquids.

In the drawings accompanying and forming part of this specification, Figure 1 is a rear elevation of my improved weighing-machine, portions being broken away and in section. Figs. 2, 3, and 4 are side elevations of the same as seen from the left in Fig. 1. Fig. 5 is a sectional side elevation. Fig. 6 is a plan view of the upper part of the machine. Fig. 7 is a detail in section, showing a portion of the supply-valve mechanism. Fig. 8 is a detail in elevation of a supply-valve. Fig. 9 is a transverse section of the same, taken in the line *a a*, Fig. 8. Fig. 10 is a detail in elevation of a discharge-valve. Fig. 11 is a transverse section taken in line *b b*, Fig. 10; and Figs. 12 and 13 are details in elevation and transverse section, respectively, of a modified form of discharge-valve.

Similar characters designate like parts in all the figures of the drawings.

The framework for supporting the several parts of the machine is represented consisting of the chambered base or bed 2, the side frames 3 and 4, rising therefrom, and the brackets 5 and 6, which extend oppositely from the supply-chamber H, the latter being in communication with a source of liquid-supply and situated over the load-receiver of the weighing mechanism to deliver a stream or streams of liquid thereto.

The weighing mechanism comprehends a load-receiver or bucket, as G, and a beam or plurality of beams, as B and B′, the latter being substantially similar in construction, mounting, and mode of operation to the beams shown and described in Letters Patent No. 548,840, granted to me October 29, 1895, to which reference may be had.

The load-receiver or weighing-bucket G in the form represented consists of two sections, (designated, respectively, by 7 and 8,) the lower section 7 being constructed of heavy metal and the upper section being constructed of sheet metal. The lower edge of the upper sheet-metal section is suitably secured within the lower section, a series of rivets or other fastening devices, as 9, being provided to fasten the parts together. The lower section 7 of the weighing-bucket G has a discharge-outlet or outlets, as will hereinafter appear, through which the liquid constituting the load is adapted to flow, suitable means being furnished normally to cover said discharge-outlet. The lower section 7 of the bucket may be cast in a single piece, it having a plurality of depending spouts, as 10 and 12, of suitable shape, in which are formed valve-seats, as 13, the discharge-outlets of the spouts being closed normally by suitable valves, as L and L′. The upper section 8 of the load-receiver is in the form of a sheet-metal shell substantially of elliptical shape in longitudinal section.

In a bucket constructed as previously described the downflowing stream of material from the supply mechanism is adapted to strike the heavy metallic lower section 7 of the bucket, the pressure, as will be obvious, in a stream of liquid being considerable.

The sheet-metal shell 8 possesses lightness, so that the weighing-bucket as a whole is strong and serviceable.

For the purpose of increasing the stability of the sheet-metal shell 8 a series of tie bars or bolts, as 15, are provided, the opposite threaded ends of which pass through suitable openings formed in the longitudinal sides of said shell, said ends being engaged by nuts, as 16, to hold the bolts in place.

The supply-chamber H, which is carried by the framing of the machine, is provided with a series of depending spouts, as 17 and 18, having therein tapered or reduced valve-seats, as 19, and a series of valves, as V and V′, adapted to close against the tapered valve-seats 19. The valves V and V′ are pivoted to the curved arms 20 and 21, fixed to and extending forward from the rock-shaft 22, carried by suitable arms or bearings 23 on the brackets 5 and 6.

For advancing the valves V and V′ toward their seats a weight 24 is represented, said weight having at its opposite ends the arms

25 and 26, suitably secured to the rock-shaft 22 and normally tending to advance the valves, this action, however, being limited by weighing or beam mechanism, as will hereinafter appear.

The supply-valves V and V′ preferably embody as a part thereof a packing of expansible or yielding material adapted to bind firmly against the valve-seats 19, whereby leakage of the liquid when said valves are shut is prevented. The two supply-valves are similar in construction, and it is therefore deemed necessary to describe but one of them in detail. (See Figs. 8 and 9.) The valve represented in said figures has a body portion 30 in the form of a disk having an annular shoulder 31 on its upper face, which is surrounded by a packing-ring 32 of suitable expansible or yielding material, such as rubber, which is adapted to bind firmly against the inclined or tapered valve-seat 19.

A spindle or stud is represented at 33 passing through a suitable aperture formed centrally in the valve, said spindle or stud having a bifurcated end portion 34, through the branches of which a pivot-pin, as 35, carried at the outer end of the curved arm 20, is adapted to pass, said pin being headed at its opposite end to retain it in position. The packing-ring 32 is held in place by a disk 36 in engagement with the upper end of the spindle, which disk is secured by a nut 37.

For the purpose of imparting a comparatively great amount of force to the two valves V and V′, I have provided the cam and counterweighted-lever valve-actuating means illustrated in the patent hereinbefore referred to, said cam being designated by 38 and being fixed to the rock-shaft 22. The cooperating valve-actuating lever is designated by 39, and it is pivoted to the side frame 4, near the upper end thereof, an antifriction-roll 40 at one end of the lever running in contact with the working face of the cam to advance the two valves.

The discharge or closer valves L and L′ on the load-receiver are carried by a shaft, such as 41, journaled in bearings or brackets 42, secured to the lower end of the load-receiver G, said shaft having a series of forwardly-curved arms, as 43 and 44, to which the discharge-valves are preferably pivoted. The rock-shaft 41 has secured thereto at a suitable point a weight, as 45, the purpose of which is to close the valves L and L′ against their inclined or tapered seats 13, as shown in Fig. 5.

The discharge-valve L (represented in detail in Figs. 10 and 11) comprehends in its construction a disk 50, having an annular wall 51 thereon, surrounded by an expansible or yielding packing-ring 52, of rubber or analogous material, held in place by the retaining-plate 53, through which is passed the stud 54, embraced at its upper end by the securing-nut 55. The stud has at its lower end the bifurcation 56, through the branches of which the pivot-pin 57, carried at the outer end of the curved arm 44, is passed.

In Fig. 5 the valve L′ is represented as being closed against its inclined seat 13, the yielding or rubber packing-ring 52 being caused to lie against said seat, in which position it, with its companion valve L′, will be held by suitable means, as the counterweighted latch D. The latch D is pivoted on the load-receiver and is adapted to engage the rocker 60 when the valves L and L′ are shut, as represented in Fig. 2. The rocker 60 is pivoted at 61 to the load-receiver, and it has connected thereto the rod 62, which is similarly attached at its opposite end to the crank-arm 63 on the rock-shaft 41.

The construction and operation of the latch D, the rocker 60, and connecting-rod 62 are shown and described in detail in the Letters Patent hereinbefore mentioned, and it is therefore unnecessary to describe the same at length.

The valve-supporting rock-shaft 22 has near one end thereof the crank-arm 65, to which is pivoted the rod 66, bearing against the inner end of the lever 67, shiftably carried by the beam B, as shown and described in said patent, so that as the beam mechanism and load-receiver G descend during the supply of the liquid the inner end of said lever 67 by falling away from the rod 66 will permit the weights 24 on the shaft 22 and 39′ of the lever 39 to drop, and thereby close the valves V and V′ or move them toward their seats.

The spouts 17 and 18 of the supply hopper or chamber H terminate in the flared hoods 70, which act as guards to prevent spattering and waste of the liquid on the opening of the supply-valves, the discharge-spouts 10 and 12 on the load-receiver being furnished with similar hoods, as 71, for the same purpose.

The shaft 22 of the supply-valves has affixed thereto the depending rod 75, cooperative with a by-pass 76 on the scale-beam B′ in the manner shown in the Letters Patent mentioned, whereby the rod will abut against the by-pass stop 76 at a predetermined stage in the advancing movement of the valves to intercept the same for permitting a reduced stream, as shown in Fig. 7, to flow into the load-receiver G to complete the partial load therein.

The rod 66 is furnished with a tripping device 66′, adapted to engage the projection 66″ on the latch D when the supply-controlling valves V and V′ are fully closed, thereby to trip the latch D for effecting the release of the discharge-valves L and L′, so that they can be forced open by the weight of the contents in the load-receiver, such contents being discharged into the hopper H′, secured in the base 2 below the weighing mechanism.

The operation of the hereinbefore-described machine, briefly stated, is as follows: Figs. 2 and 5 show the positions occupied by the re-

speetive parts at the eommeneement of operation, the diseharge-valves L and L′ lying in contaet with their seats 13, the lateh D being in engagement with the roeker 60, and the valves V and V′ being open, so that eomparatively large streams of material will enter the empty bueket G and at a certain point will cause the same to descend, the beam meehanism moving therewith, and the lever 67, earried by the beam B′, falling away from the rod 66, will permit the two valves V and V′ to be advanced or swung toward their seats. When the load is almost eompleted, as shown in Fig. 3, the rod 75 will abut against the by-pass stop 76 on the beam B′, thereby to hold the valves in the positions shown in Fig. 7, so that a drip-stream will be eansed to enter the load-reeeiver to eomplete the load. On the eompletion of the load the by-pass stop 76 will pass below the rod 75 and release the valves V and V′, so that they ean be instantly closed, as shown in Fig. 4. On the final movement of the parts the tripping deviee 66′ will strike the pin 66″ on the lateh D, thereby to trip the latter and disengage it from the roeker 60. On the disengagement of these two parts the valves L and L′ are released and foreed open by the weight of the load in the bueket, said load being diseharged into the hopper H′. When the bueket has been entirely emptied, the closer or diseharge valves L and L′ will be shut by the weight 45, following whieh the other parts of the maehine will be returned to their primary positions to repeat the operation.

In Figs. 12 and 13 I have illustrated a modified form of discharge-valve, the bifurcation 56′ and the spindle 54′ being integral with the disk 50′. With these exeeptions the valve represented in Figs. 12 and 13 is the same as that shown in Figs. 10 and 11.

Having described my invention, I claim—

1. The combination, with weighing meehanism including a load-reeeiver, of a supply-ehamber having a tapered valve-seat; a earrying device; a disk valve pivoted to said earrying deviee and having an expansible paeking; and means eoöperative with the weighing mechanism for moving the valve toward its seat during the deseent of the load-receiver.

2. The combination, with weighing meehanism including a load-reeeiver, of a supply-chamber having a tapered valve-seat; a shaft provided with an arm; a disk valve pivoted to the arm and having an expansible paeking; and means eoöperative with the weighing meehanism for moving the valve toward its seat during the deseent of the load-reeeiver.

3. The eombination, with weighing meehanism including a load-receiver, of a supply-ehamber having a plurality of tapered valve-seats; a shaft provided with a series of forwardly-extending arms, said shaft also having a series of oppositely-disposed arms joined by a valve-elosing weight; a series of valves pivoted, respeetively, to the forwardly-extending arms and elosable toward the respeetive valve-seats; and eonneetions betweeu said shaft and the weighing mechanism for eontrolling the valves.

4. The eombination, with weighing mechanism ineluding a load-reeeiver having a tapered valve-seat; a shaft on the load-reeeiver, provided with an arm; a diseharge-valve pivoted to said arm; means for holding said valve shut; a supply-chamber having a tapered valve-seat; a shaft provided with an arm; a disk valve having an expansible paeking and pivoted to said arm; and means for elosing said last-mentioned valve toward the valve-seat during the deseent of the load-reeeiver.

5. A weighing-bucket consisting of two sections, the lower seetion being eonstrueted of heavy metal and the upper seetion of sheet metal, said lower seetion eomprehending a discharge-outlet and the upper seetion being in the form of a shell the lower edge of which is seeured in the other seetion, in eombination with beam meehanism for supporting said weighing-bucket; and means for eontrolling the diseharge from the weighing-bueket.

6. A weighing-bueket consisting of two sections the lower section being eonstrueted of heavy metal and the upper seetion of sheet metal, said lower seetion comprehending one or more discharge-outlets and the upper section being in the form of a shell the lower edge of whieh is secured in the lower seetion, a series of tie-bolts extending transversely of the sheet-metal shell, and nuts engaging threaded ends of the bolts, in eombination with beam mechanism for supporting said weighing-bucket; and means for controlling the discharge of said bucket.

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